Social Change and Environmental Education

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A B S T R A C T

Complexity and individualisation are two phenomena increasing in industrialised societies; they pose particular challenges to learning and teaching in school education. Environmental educators are able to make important contributions to the developing of solutions to these challenges as is seen in examples of recent approaches taken by schools. These ideas provide a basis for developing criteria for evaluating quality of environmental education.

Environmental education has become an international movement in a relatively short time. In this paper I want to argue that this movement provides answers to fundamental challenges to the culture of learning and teaching in schools. I shall first describe two generic developments in industrialised societies: increasing complexity and growing individualisation. Some of the challenges which they produce for education are set forth in the second section. I shall then illustrate contributions of environmental school initiatives to an emerging educational culture, and conclude by proposing some quality criteria for environmental school initiatives.

Developments in industrial societies

The complexity of conditions of life

> *the enormous 'life potential' of economic and technological development is confronted with a growing 'death potential'*

In this millennium, in fact in the last three hundred years, technical extensions of human anatomy have surrounded citizens of technologically sophisticated societies with a rapidly increasing array of artificial 'cognitive limbs.' For example, radio telescopes and electron microscopes, CD-ROMs, computers, robots and tele-communication systems have allowed an enormous increase in the capacity to access, store, process, use and communicate information. The huge variety of these artificial 'limbs' and their manifold interactions with natural systems have significantly contributed to the complexity which people in those societies experience. The effects of this kind of change have become less and less foreseeable and controllable. They have created a situation in which the enormous 'life potential' of economic and technological development is confronted with a growing 'death potential'. The changes have been accompanied by or contributed to threats to global integrity such as the depletion of the ozone layer, increased global warming and more rapid extinction of species with its associated reduction in biological diversity.

A significant consequence of growing complexity has been the decrease of problem-solving capacity of large socio-economic systems. This is illustrated in tendencies to privatise public services and to devolve to individual citizens responsibility for environmental quality, for social security and even for safety. In the past, so-called 'dynamic qualities', such as the ability and willingness to shape professional and public life, have been limited to the so-called élites in society, to politicians, entrepreneurs, academics, and artists. It seems that these competences and the values associated with them are now expected from more and more citizens.

Let me provide some illustrations of this claim. They are taken from emerging patterns of work which were first exemplified in the automobile industry (OECD/CERI 1985):

- Routine activities, that is, those tasks for which the sequence of activities can be predetermined in every detail, are decreasing as a proportion of human work. They are being taken over by computerised technical systems in 'deserted' manufacturing plants. As a result, demand for professional qualification has increased.

- There is a clear trend towards team-work. Human/machine interaction is being replaced by team/technical system interaction. Increased emphasis is being placed on communication and social skills to complement technical skills.

- There is an increased emphasis on the 'multifunction' worker who is able to cope with organisational, executive and supervisory tasks.

- The demands for recurrent vocational reorientation and for continuous learning are increasing. In some occupations such as those in computer applications it is sometimes difficult even to distinguish between work and training.

The individualisation process—"I did it my way"

'the rights, duty and possibility to shape one's life at one's own terms are only now becoming a widely held claim and an emerging reality'

These words from a song by Frank Sinatra characterise a continuing and global development. It is the process of individualisation, one about which there is little dispute. For Sloterdijk (1993) it is a late stage of human development, when 'singles' are populating bigger and bigger cities. According to Fend (1990), 200 years after the Age of Enlightenment "the rights, duty and possibility to use one's mind without being led by somebody else, and to shape one's life at one's own terms are only now becoming a widely held claim and an emerging reality".

From this individualisation process has emerged a problem described by game theory. Let me illustrate it with an example. Two players are involved in the same game. Let's assume that they are playing against a bank. Both players have two strategies at their disposal: to defect or to cooperate. If both of them cooperate, they gain three points each. If both defect, their gain is one point each. If one defects and the other cooperates, the defector gets five points and the other nothing.

What would be a rational behaviour in such a situation? The rational player would clearly choose to defect. This is the best choice if the partner cooperates because the defector's gain is 5 points. It is also the best choice if the partner defects; the first partner's gain is still one point whereas cooperation would have brought them nothing. It is therefore likely that both players will defect and receive one point. If both had cooperated each would have gained three points but cooperation carries the possibility of receiving nothing (Sigmund 1992).

It is not difficult to illustrate this rather formal model by examples from everyday life. One's own environmentally sensitive—or 'cooperative'—behaviour brings less comfort and has in many cases no advantage if all others do not care, that is if they 'defect.' On the other hand, a person's own carelessness can be very advantageous to them if others behave in an environmentally sound way. As a result it is 'economical' to do both: to plead for environmentally responsible behaviour in others and not to care about it in one's own behaviour. If we start from the assumption that, in general, people do what they consider useful to them one would expect defective rather than cooperative—or morally defensible—behaviour. And this is actually what we often get.

Challenges schools are facing today

The two developments of growing complexity and individualisation occurring in many societies are producing a number of challenges to schools (Posch 1994a). These challenges include four discussed briefly below—developing systems of rules, maintaining the continuity of social relationships, supporting student acquisition of dynamic qualities and promoting reflective and critical approaches to knowledge.

Developing systems of rules

If established social structures lose some of their stability and legitimation, new rules have to be developed by the kind of negotiation process already practised in many areas of life, such as the socialisation of the young in their families. What is allowed and not allowed is no longer only a parental decision but is negotiated. Many pupils with these experiences are confronted when they come to schools with a culture of predetermined demands with little space for negotiation. Schools in general are only beginning to find ways to cope with a form of social development in which negotiation of rules and norms is gaining importance over coercion. How can they contribute to this process of negotiation rather than impede it?

Maintaining the continuity of social relationships

Continuity of social relationships appears to be an indispensable condition for cooperative behaviour and social responsibility. This has also been illustrated by experiments in game theory. If a relationship is maintained for a longer time the tendency to defect decreases and the mutual trust necessary for cooperation can develop (Sigmund 1993).

Can schools create situations in which young people experience continuity in social relationships and the advantages of cooperation over defection?

Supporting the acquisition of dynamic qualities

More and more individuals will have to be able and be willing to cope with unstructured situations, to define problems and to accept and occupy responsible positions of authority and action-taking. This challenge to develop 'dynamic qualities' (Posch 1990 & 1994c, Elliott 1991) can be illustrated in two very different ways:

* the increasing importance of so-called 'key qualifications' such as having the capability to cooperate and to work in teams, to communicate clearly, not only in one's first language but also in at least one other language, to identify and solve problems, to comprehend and to critically utilise media materials, and to readily undertake life-long learning. These capabilities appear to be coming to be seen more and more as threshold abilities for participation in work and in society (for example by the European Round Table of Industrialists 1994).

* an increasing number of students find it difficult to connect their school experience with a positive vision of a future for themselves and therefore lose motivat-

ion to succeed at school. Presently nearly 20 million persons are unemployed in the European Union.
This does not appear to be a passing phenomenon but to follow the 'logic' of the prevailing economic system which often means ever more and better work from ever fewer people. As a result mass unemployment would appear to be set to become a structural property of society in the future.

Elliott (1996) provided some objective arguments to support the development of dynamic qualities:

> If young people are to live satisfactory and fulfilling lives they will need to construct personal identities which are less dependent on job satisfaction and learn to participate in society as active citizens capable of influencing the social conditions which shape their lives.

Among young people there also appears to be a growing subjective quest to be taken seriously, to be able to influence their conditions of life and to leave 'traces' of themselves in their environments. In an interesting rephrasing of Descartes' statement on the nature of human existence, "I think, therefore I am" a seemingly well-educated young person in a radio report provided a vivid illustration of this suggestion: "I throw stones, ergo sum." What can schools do to enable young people to shape their environments in responsible and constructive ways? What opportunities can schools provide in which young people experience that they can make a difference and that they 'matter' in society?

Promoting reflective and critical approaches to knowledge

Dependence on scientific knowledge has enormously increased. On the other hand, science is regarded also as a producer of risks and therefore tends to be met with increasing doubt and scepticism. This creates a paradoxical situation in which substantive knowledge becomes as important as a fundamental scepticism against whatever is offered as knowledge. It may imply that the definition of 'important knowledge' can no longer be left only to traditional authorities but must be established also by negotiation. "Confidence shifts from confidence in contents—established rules, data, methods—to confidence in processes that allow us not to eliminate but to keep error under control" (Losito & Mayer 1993).

This has also been expressed in the following remarks on the Folkeskole, the Danish compulsory school:

> Technological development has led to a stream of information which is at the same time easily accessible and almost inexhaustible. It is therefore more important than ever before that pupils acquire the skills which enable them to be selective in relation to this massive spread of information.
> (Danish Council for Educational Development in the Folkeskole 1992)

How can schools provide opportunities to combine advocacy of knowledge with inquiry, and how can they promote appreciative and critical stances towards knowledge?

The challenges described above place heavy demands on schools. On the other hand they offer also new chances for schools. Schools can gain considerably in the importance they have, and are considered to have, to society if they develop constructive answers to these demands.

Elements of a culture of learning and teaching for the future

'a culture of learning and teaching for the future will have to successfully contain the tensions emerging from the presence of contrary elements'

The prevalent cultures of teaching and learning are still attuned to a relatively static society in which the necessary knowledge, competences, and values are predefined and stored in curricula, tests and accredited textbooks. Schools are expected to prepare the majority of children and young people to satisfactorily meet the demands which others have defined for them (Posch 1994a). The main characteristics of these cultures are as follows:

- **A predominance of systematic knowledge.** Priority is given to well-established facts allowing schools to maintain a close relationship with the results of academic knowledge production. Low priority is given to open and controversial areas of knowledge and to personal experience and involvement.

- **Specialization.** Knowledge is compartmentalised in subject matter fields which more or less correspond to the academic disciplines. Complex, real-life situations tend to be disregarded because they cross disciplinary boundaries.

- **A transmission mode of teaching.** This mode facilitates the retention of the systematic character of knowledge and its reconstruction by the student. It tends to discourage the generation and reflective handling of knowledge.

- **A prevalence of top-down communication.** This discourages self-control and cooperation among students, and among teachers, and networking within and across school boundaries.

A culture of learning and teaching for the future will have to successfully contain the tensions emerging from the presence of contrary elements, both static and dynamic ones. Further, the balance of the two will have to shift if schools are to find answers to social changes presently occurring. Environmental education can contribute

significantly to schools developing their learning and teaching cultures towards the future, as the following examples show.

Environmental education's potential for conributing to learning for the future

Environmental education is an educational movement which has already shown that it is able to provide constructive answers to educational challenges and to introduce dynamic elements into education. This movement has been driven by innovative projects such as OECD/CERI's 'Environment and School Initiatives' (ENSI) and by the many teachers who have developed environmental initiatives on their own (OECD/CERI 1991 & 1995). These projects and intiatives have often contained approaches in which some answers to the challenges identified above have been found and which have contributed to creating new balances of static and dynamic elements in education. Brief descriptions of a few dimensions of this work by schools will now be provided.

Generation of 'local knowledge'

In this dimension students generate local knowledge through interdisciplinary learning and research in order to better understand their environments.

The energy network. In a secondary school in the Tyrol, Austria, 13 to 14 year old students studied the use of energy in four small villages (Posch & Mair 1997). They prepared a questionnaire, went from house to house in pairs, asked for collaboration and offered assistance in data collection. Nearly 70% of the households completed the questionnaire. Students produced a comparative analysis of the use of energy for each house and for each village, which they presented at a public event. People who had asked for it were provided with a list of proposals for saving energy on the basis of their individual data.

The teachers and their students kept research diaries to facilitate reflection on the progress of their work. A follow-up activity which emerged from this initiative was the establishment of several local initiatives to manufacture solar collectors. The knowledge which these students produced was 'new', knowledge not available before. It was of potential use for other people and its production demanded an interdisciplinary approach.

Socially important action

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⁶ young people ... are able to leave constructive traces in society here and now⁹

Here students shape aspects of the conditions of life in their environments in order to achieve recognizable improvements of some continuity.

Take pride in Pumpherston. The teachers and children of a Scottish school initiated a project which they called "Take pride in Pumpherston" (McAndrew & Pascoe 1993). They started with a survey in their village to find out what could be done. They designed a simple questionnaire and interviewed people in the streets, analysed the answers and selected those which they felt able to tackle. They made window boxes, planted bulbs and shrubs along a street, cleared and revitalised the polluted village pond, and wrote a pond wildlife guide for the inhabitants. They established a meeting place for elderly people near a supermarket, and created a giant mural outlining the mining history of the village. For these and other initiatives they had to carry out several interactions with the community beyond the school: they wrote for permission to the community council; they obtained the cooperation of the forestry commission and several companies for example for the supply of shrubs and trees; they arranged for an ornithologist to inform them about the possibilities of bringing birds back to the pond.

This example shows that even young children can have an impact on their conditions of life by gentle and small-scale interventions. In this kind of intiative young people experience that they are able to leave constructive traces in society here and now.

The creation of dynamic networks

The creation of networks has probably the greatest potential for developing the culture of learning and teaching in schools. The energy network described above was followed by an analysis of the energy situation of a more sizeable community. Later, it was elaborated upon, and involved local enterprises such as chimney sweepers and plumbers. Schools and the local authorities in other communities learnt about the concept on-site and were visited and assisted by students and teachers of the school initiating the network.

Since then several communities have created their own local network linking public authorities, schools, enterprises, and citizen groups to study, discuss and implement specific improvements to their energy situations (Mair, Mallaun & Altrichter 1994, Posch & Mair 1997).

A main strength of what is now called the Energy Network is its emphasis on communication and joint reflection on values, on observable features of real-life situations and on feasible improvements to them. The project's philosophy is one which regards energy not merely as a matter of technical solutions and expert services but also as a matter of communication and local negotiations; this has allowed it to produce a remarkable impact and gain much appreciation.

Such dynamic networks, in which teachers and students actively create task-oriented relationships with each other and with other parties, can lead to substantial modifications to environmental quality. They are the results of values embedded within the social structures in whose creation students and other persons involved have participated and in which they have significant roles.

Such dynamic networks differ in several respects from hierarchical structures of communication (Fischer-Kowalski 1991, Posch 1994b):

- The relationship between the persons involved is relatively symmetrical, not one of subordination and superordination.

- There is a positive cost/benefit relationship for each participant. Everyone gets at least as much out of the interaction as they invest in it.

- Ongoing exchange processes stimulated by a reflective approach to action are the basis of these dynamic networks.

- The perception of shared interests stimulates the development of such dynamic networks along task-specific routes rather than pre-specific ones. The decision to participate is a matter of negotiation between the parties concerned and relationships can develop quite spontaneously.

Dynamic networks contradict one of the traditional assumptions of schooling, the assumption of a separation of school and society. If dynamic networks develop it is difficult to say where the educational organisation ends and where society and its abundance of personal and institutional relationships begin.

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⁶ To prepare for life means to realize something now ⁹

Activities to produce knowledge and to influence environmental situations confront students with open-ended situations and with controversial perceptions of reality and values. They provide the experience that environmental situations are determined by human intervention and that students can actively participate in the construction of reality. A relationship is established between school learning and activities to cope with real-life problems. As a 15 year old student put it: "To prepare for life means to realize something now" (Mair 1990). The justification of these activities is not primarily derived from their assumed learning potential but from the determination to improve the quality of the students' environment.

Criteria for quality environmental learning for the future

Environmental school initiatives representing dimensions of this kind can give young people the experience that they 'matter' in society and that they are able to leave personal traces which are respected. From this work a number of criteria emerged which appear to be of critical importance for the quality of the learning process (Elliott 1995a & b, Mayer 1995, Posch 1995):

The initiatives should
- enable students to experience personally the

environmental situations which they study and which they try to influence,

- provide space for individual and collaborative decision-making by students on the definition of problems and procedures,

- provide contexts for the systematic reflection on and communication of experience,

- cultivate an inquisitive approach to knowledge— which should be considered as disputable by students to assist them to identify and respond to problems.

These procedural criteria appear to be indispensable prerequisites for the development of dynamic qualities such as initiative and self-determination, and for the promotion of individual and collective responsibility and sensibility.

Conclusion

High level environmental school initiatives are important with respect to environmental education, and for developing the culture of learning and teaching on a more general level. There is evidence in several countries that initiatives of this kind slowly affect mainstream learning and teaching. Several new national syllabi provide explicit space for school initiatives which can be negotiated with students (Posch 1996). Official policy statements provide legitimation for teachers who cross traditional borders between school and the environment. In Austria, for example, a Ministerial decree on environmental education clearly stated that "the direct participation of pupils [in solving] environmental problems close to their experience is a characteristic of this instructional task" (Bundesministerium fuer Unterricht und Kunst 1985).

There are indications that the balance is changing between two important tasks of schooling—systematic knowledge transmission and complex, real-life learning situations (Thonhauser 1993). More importance than in the past is given to learning situations which cross disciplinary boundaries, which provide access to controversial issues and which invite the generation and reflective handling of knowledge. This shift indicates that more and more teachers and students will not remain merely passive recipients of demands from established power structures in society but that they will wish to be able to express and realise their views of the society in which they want to live. ☉

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